1	**Soils consist of:**								
A	grains and particles	B	water and air voids	C	void and spaces	D	grains and water voids only	E	particles and air voids only
2	**The principles of soil mechanics are:**								
A	a description of the basic soil properties.	B	denied the basic soil properties.	C	The application of soil properties to the solution of soil engineering problems	D	The use of the above soil structure properties to the solution of soil engineering problems.	E	solids and voids
3	**soil's mechanical properties are:**								
A	strength.	B	stiffness.	C	permeability.	D	water content	E	clay percentages
4	**built on soil projects such as:**								
A	foundations, bridges, tunnels, roads	B	foundation, bridges, basement	C	foundation, bridges, buildings	D	tunnels, culverts, basements	E	Non of these
5	**the role of the void phase is:**								
A	Chemical & physical Interaction	B	crushing the particles	C	bending the grains	D	all of these	E	Non of these
6	**The behavior of the soil is one of the complicating characteristics which depends on:**								
A	pressure	B	time	C	environment	D	all of these	E	non of these
7	**The role of solid phase in soil mass can explains as:**								
A	loading reaction	B	increase solubility	C	increase the probability of quick sand	D	all of these	E	none of these
8	**The stability of slopes depends on**								
A	height of the slope	B	weight of the soil	C	existence of water	D	uncounted forces	E	All of these
9	**The soil can be found:**								
A	beside structures	B	above structures	C	below structures	D	structure itself	E	All of these
10	**The roles of void in soil is ...**								
A	Water erosion and pressure	B	influence the shear strength	C	Increase stability	D	Non of the above	E	A & B
11	**Failure in an excavation is due to ...**								
A	Slope slip	B	Type of water	C	water Scape	D	No failure	E	Non of these

12	**The role of solid phase in soil mass can explains as:**								
A	loading reaction	B	increase the probability of quick sand	C		D	non of the above	E	A & B
13	**GM symbol means:**								
A	Gravelly clay soil	B	Clayey gravel soil	C	Gravelly silt soil	D	Silty gravel soil	E	Non of these
14	**The maximum relationship between liquid limit and plasticity index is:**								
A	A-Line	B	U-Line	C	Flow index	D	Effective diameter	E	Non of these
15	**The parameter which explains the real state of soil is:**								
A	PL	B	LL	C	LI	D	PI	E	E
16	**Amongst the clay minerals, the one having the maximum swelling tendency is:**								
A	kaolinite	B	montmorillonite	C	halloysite	D	illite	E	illite and montmorillonite
17	**What is the name of soil type – according to its gradation – if the soil particles were relatively similar in size?**								
A	Not poorly graded soil	B	Uniformly graded soil	C	Well graded	D	all of these	E	Non of these
18	**SP-SM means:**								
A	poorly graded silt with sand	B	poorly graded silt	C	uniformly sand with silt	D	sandy silt	E	Non of these
19	**If the soil symbol is SP-SM, which of the following sentences is correct?:**								
A	The sand portion in the sample is well-graded	B	The silt percent in soil is more than clay	C	The coefficient of uniformly must be lower than 6	D	The fine soil portion located under A-line	E	Non of these
20	**The rubber-balloon test used water because water is….**								
A	Cheap	B	Have no color and compressible	C	Incompressible and available	D	All the above	E	Non of these
21	**AASHTO classification system used to classify soil in:**								
A	highways	B	towers	C	slope stability	D	All the above	E	Non of these
22	**According to Darcy's law for flow through porous media, the velocity is proportional to:**								
A	effective stress	B	hydraulic gradient	C	cohesion	D	angle of internal friction	E	Non of these

23	**the field pumping test to estimate the soil permeability are:**								
A	confined flow test	B	unconfined flow test	C	auger hole test	D	inverse auger hole test	E	A & B
24	**the hydraulic gradient in soils is related to:**								
A	pressure, elevation and velocity heads	B	pressure and elevation heads	C	elevation head only	D	pressure head only	E	Non of these
25	**The coefficient of permeability can be increased with increase in:**								
A	particle size	B	degree of saturation	C	temperature	D	viscosity	E	A, B & C
26	**the water head in the laboratory permeability test must be ..... for the fine soil particles.**								
A	dropped	B	fixed	C	changed incre asingly	D	constant	E	Non of these
27	**Which of the following methods is best suited for determination of permeability of coarse-grained soils?**								
A	falling head test	B	constant head test	C	falling or constant tests	D	Not constant head test	E	Non of these
28	**pumping-out seepage water from construction excavation is a function of;**								
A	permeabilit y	B	temperature	C	soil particle size	D	deep groundwater	E	Non of these
29	**increasing in the degree of saturation leading to:**								
A	increasing in the soil permeabilit y	B	decreasing in the coefficient of soil permeability	C	increasing in the volume of the soil particle	D	increasing in the water content	E	Non of these
30	**coefficient of soil permeability (k) is dependent on:**								
A	soil grains size	B	grain size distribution	C	degree of saturation	D	fluid characteristics	E	All of these
31	**steady state flow means:**								
A	no change in flow velocity with time	B	no change in flow velocity with distance	C	flow velocity changes with time and/or distance	D	All of these	E	Non of these
32	**the velocity head from fluid flow in the soil is eliminated due to:**								
A	small velocity	B	the flow is slow	C	high velocity	D	been forgotten	E	Non of these
33	**best compacted soil happened when the soil is**								
A	dry	B	fully saturated	C	having coarse grains	D	having minimum void ratio	E	Non of these
34	**Choose the most suitable compacter to compact a trench with width equal to 1.5m filled with soil classified as CM.**								

A	Rammer	B	Sheep-Foot Roller	C	Nuclear machine	D	Hand-Held Vibrating Plate	E	Non of these
35	**Rise of water table above the ground surface causes …**								
A	increase in total stress	B	increase in effective stress	C	decrease in effective stress	D	All of these	E	Non of these
36	**with water table lowering, the effective stress will ...**								
A	decreases	B	increases	C	decreases then increases	D	All of these	E	Non of these
37	**No. of flow channels is**								
A	Nd	B	Nf	C	H	D	ht	E	Ic
38	**No. of head drops is**								
A	ht	B	ie	C	Nf	D	Nd	E	H
39	**critical hydraulic gradient (from soil properties)**								
A	ic	B	ie	C	ht	D	H	E	Nd
40	**water head (ht-he) is**								
A	he	B	H	C	ht	D	hp	E	U
41	**exit hydraulic gradient (from water flow) is**								
A	ic	B	ht	C	H	D	ie	E	Nf
42	**The shape of clay particle is usually:**								
A	elongated	B	unflaky	C	sheets	D	All of these	E	Non of these
43	**The particles are deposited to form sedimentary soil due to**								
A	velocity reduction	B	solubility decrease	C	electrolyte increase	D	All of these	E	Non of these
44	**The types of soil according to the method of weathering**								
A	coarse grained	B	fine grained	C	coarse grained and fine grained	D	All of these	E	Non of these
45	**When the products of rock weathering are not transported as sediments but remain in place, the soil is:**								
A	alluvial	B	residual	C	glacial	D	fill	E	Non of these
46	**The weathering of parent rocks affects on**								
A	size of soil particles	B	sedimentation velocity	C	transportation of soil	D	All of these	E	Non of these
47	**Features of soil structure can affect**								

A	soil strength from faults	B	vertical permeability	C	strength from cementing and bonding	D	All of these	E	Non of these
48	**Sediments can be transported by:**								
A	water	B	air	C	ice	D	gravity	E	All of these
49	**When the products of rock weathering are not transported as sediments but remain in place, the soil is:**								
A	residual soil	B	glacial soil	C	Sedimentary Soil	D	All of these	E	Non of these
50	**In the flocculated structure in soils, the particles are:**								
A	parallel	B	edge to face	C	face to face	D	All of these	E	Non of these
51	**Dispersed type of soil structure is an arrangement comprising particles having….**								
A	edge to face orientation	B	edge to edge orientation	C	face to face or parallel orientation	D	All of these	E	Non of these
52	**It is one of the laboratory methods to find the shear strength parameters (C & □):**								
A	triaxial test	B	SPT	C	Oedometer	D	permeameter	E	Non of these
53	**The symbol of the excess pore water pressure immediately after the application of the load is:**								
A	ue	B	uo	C	uss	D	h	E	H
54	**Physical properties of a permeant which influence permeability are:**								
A	viscosity only	B	both viscosity and unit weight	C	unit weight only	D	All of these	E	Non of these
55	**Quick sand is a…..**								
A	type of sand	B	flow condition occurring in cohesive soils	C	flow condition occurring in cohesionless soils	D	flow condition occurring in both cohesive and cohesionless soils	E	Non of these
56	**Sand particles are made of …….**								
A	rock minerals	B	kaolinite	C	illite	D	montmorillonite	E	Non of these
57	**According to Darcy's law for flow through porous media, the velocity is proportional to:**								
A	cohesion	B	angle of internal friction	C	hydraulic gradient	D	effective stress	E	Non of these
58	**The quantity of seepage under ……. and sheet piling can be estimated using the graphical construction known as a flownet.**								
A	Hydropower	B	Hydroelectricity	C	Water turbine	D	Dam	E	Non of these
59	**k has the units m/s and is the average velocity of water passing through a porous medium under a unit ……..**								
A	Pelton wheel	B	Hydraulic head	C	Hydroelectricity	D	Dam	E	Non of these
60	**Which of the following methods is best suited for laboratory determination of permeability**								

	of fine-grained soils?								
A	falling or constant tests	B	falling head test	C	constant head test	D	pumping	E	auger hole
61	**What happens to the volume of the solid grains when soil is compacted?**								
A	Decreases	B	nothing	C	increases	D	extended	E	Non of these
62	**From soil structural features is ……**								
A	Lenses	B	Fissures	C	Bonding	D	All of these	E	Non of these
63	**for flownet in Figure 1, the number of flow channels is:**								
A	4	B	6	C	8	D	9	E	10
64	**for flownet in Figure 1, the number of drops is:**								
A	7	B	5	C	9	D	10	E	11
65	**for flownet in Figure 1, the head difference (H) is:**								
A	3.5	B	5.5	C	7.5	D	10	E	11
66	**for flownet in Figure 2, the number of flow channels is:**								
A	5	B	3	C	7	D	10	E	11
67	**for flownet in Figure 2, the number of drops is:**								
A	5	B	7	C	9	D	10	E	11
68	**for flownet in Figure 2, the head difference (H) is:**								
A	50	B	40	C	70	D	100	E	110
69	**for flownet in Figure 3, the number of flow channels is:**								
A	8	B	6	C	4	D	10	E	11
70	**for flownet in Figure 3, the number of drops is:**								
A	4	B	6	C	8	D	10	E	11
71	**for flownet in Figure 3, the head difference (H) is:**								
A	3	B	4	C	5.25	D	10	E	11
72	**for flownet in Figure 4, the number of flow channels is:**								
A	2	B	7	C	6	D	4	E	10
73	**for flownet in Figure 4, the number of drops is:**								
A	2	B	4	C	6	D	8	E	10
74	**for flownet in Figure 4, the head difference (H) is:**								
A	5	B	7	C	9	D	10.5	E	12
75	**a clay layer whose total settlement under a given load is expected to be 250mm, settles by 50mm in 15 days, the average degree of consolidation (Ua) =**								

A	40%	B	20%	C	70%	D	80%	E	90%
76	**a clay layer whose total settlement under a given load is expected to be 250mm, settles by 150mm in 125 days, the average degree of consolidation (Ua) =**								
A	40%	B	60%	C	70%	D	80%	E	90%
77	**for degree of consolidation of 50%, the time factor (Tv) =**								
A	0.2	B	0.197	C	0.1	D	0.15	E	0.25
78	**for degree of consolidation of 90%, the time factor (Tv) =**								
A	0.680	B	0.848	C	0.800	D	0.480	E	0.860
79	**the total settlement of a clay is expected to be 200mm, settles by 20mm in two weeks, the average degree of consolidation (Ua) =**								
A	50%	B	40%	C	10%	D	30%	E	20%
80	**the total settlement of a clay is expected to be 200mm, settles by 50mm in six months, the average degree of consolidation (Ua) =**								
A	35%	B	45%	C	25%	D	50%	E	60%
81	$Cc = \frac{e1 - e2}{\log \sigma'_2 - \log \sigma'_1}$								
A	Coefficient of Volume Change	B	Expansion Index	C	Compression Index	D	Coefficient of Compressibility	E	Non of these
82	$a_v = \frac{(e_o - e1)}{(\sigma'_1 - \sigma'_o)}$								
A	Coefficient of Volume Change	B	Expansion Index	C	Compression Index	D	Coefficient of Compressibility	E	Non of these
83	$m_v = \frac{1}{1 + e_o} a_v$								
A	Coefficient of Volume Change	B	Expansion Index	C	Compression Index	D	Coefficient of Compressibility	E	Non of these
84	$Cr = Ce = \frac{\Delta e}{\Delta \log \sigma'}$								
A	Coefficient of Volume Change	B	Expansion Index	C	Compression Index	D	Coefficient of Compressibility	E	Non of these
85	$Tv = \frac{Cv.t}{d^2}$								
A	Expansion Index	B	time factor	C	Compression Index	D	Coefficient of Compressibility	E	Non of these

86	$Ua = \frac{Sc_{time}}{Sc_{total}} x100$								
A	Expansion Index	B	average degree of consolidation	C	Compression Index	D	Coefficient of Compressibility	E	Non of these
87	$\sigma = \gamma . z$								
A	Total stress in homogeneous soil	B	Total stress below a river or lake	C	Total stress in multi-layered soil	D	pore pressure	E	Non of these
88	$k = \frac{\sigma_h}{\sigma_v}$								
A	Coefficient of Lateral Stress	B	Total stress below a river or lake	C	Coefficient of permeability	D	pore pressure	E	Non of these
89	$\sigma_v = \gamma . z + \gamma_w . z_w$								
A	Total stress below a river or lake	B	Total stress in multi-layered soil	C	Coefficient of permeability	D	pore pressure	E	Non of these
90	$u = \gamma_w . h_w$								
A	pore pressure	B	Total stress in multi-layered soil	C	Coefficient of permeability	D	Total stress below a river or lake	E	Non of these
91	$\sigma' = \sigma t - u$								
A	Effective stress	B	Total stress in multi-layered soil	C	Coefficient of permeability	D	Total stress below a river or lake	E	Non of these
92	$\frac{\sigma_{total}}{u} > 1$								
A	Effective stress	B	Factor of safety agains boiling condotion	C	Coefficient of permeability	D	Total stress below a river or lake	E	Non of these
93	$\Delta\sigma_v = \frac{\Delta q * B * L}{(B+Z) * (L+Z)}$								
A	Total stress below a river or lake	B	Increase in total stress from rectangular footing	C	Total stress in multi-layered soil	D	pore pressure	E	Non of these

94	**major principal stress is**								
A	**σt**	B	**σ1**	C	**σh**	D	**σ3**	E	Non of these
95	**minor principal stress is**								
A	**σt**	B	**σ3**	C	**σh**	D	**σ1**	E	Non of these
96	$\frac{\sigma_1 - \sigma_3}{2}$								
A	**σh**	B	Center of the circle	C	Radius of Mohr circle	D	**σ3**	E	**σ1**
97	$\frac{\sigma_1 + \sigma_3}{2}$								
A	**σh**	B	**σt**	C	Center of the circle	D	Radius of Mohr circle	E	**σ1**
98	**the angle of internal friction is**								
A	α	B	σ	C	**Φ**	D	γ	E	**Δ**
99	$\tau = C + \sigma \tan \Phi$								
A	Center of the circle	B	Radius of Mohr circle	C	Failure Envelope	D	**σ1**	E	**σt**
100	$\sigma_1 - \sigma_3$								
A	normal stress	B	shear strain	C	deviator stress	D	**σ1**	E	**σt**

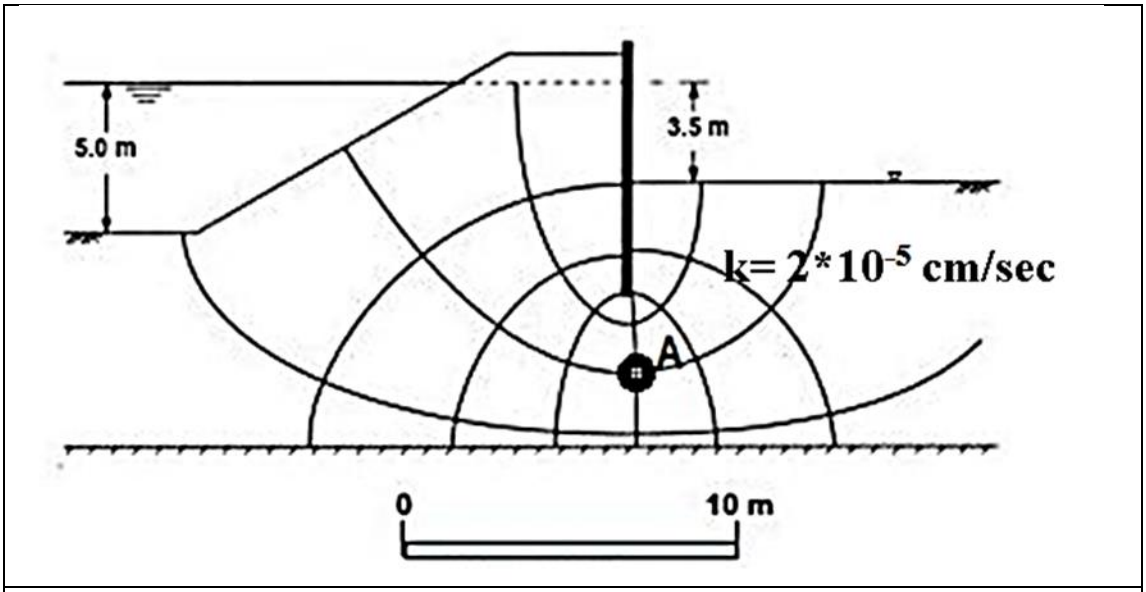

FIGURE 1

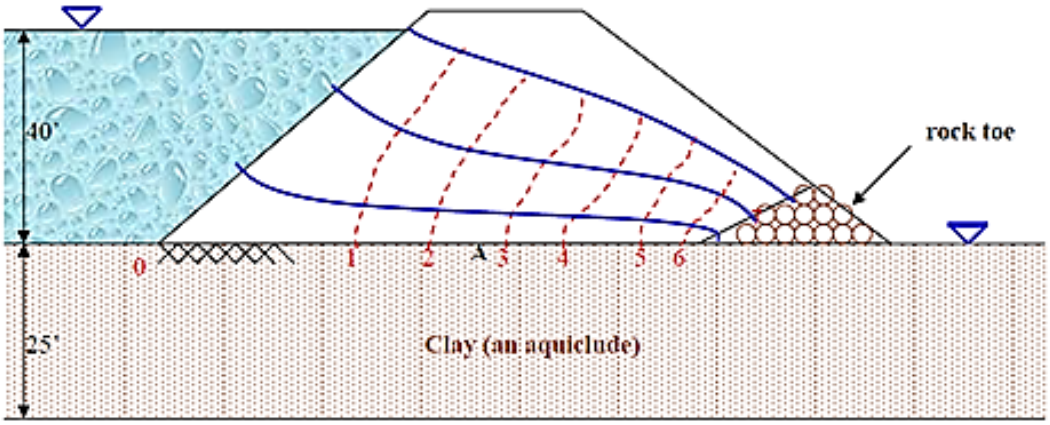

FIGURE 2

Step 4 of 12

Show the flow net for the single row sheet pile as in Figure (2).

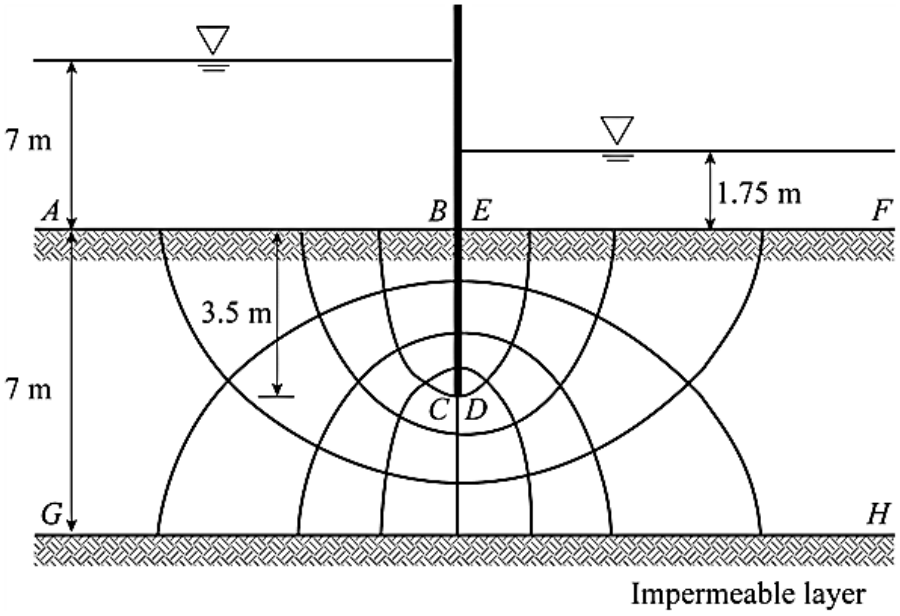

FIGURE 3

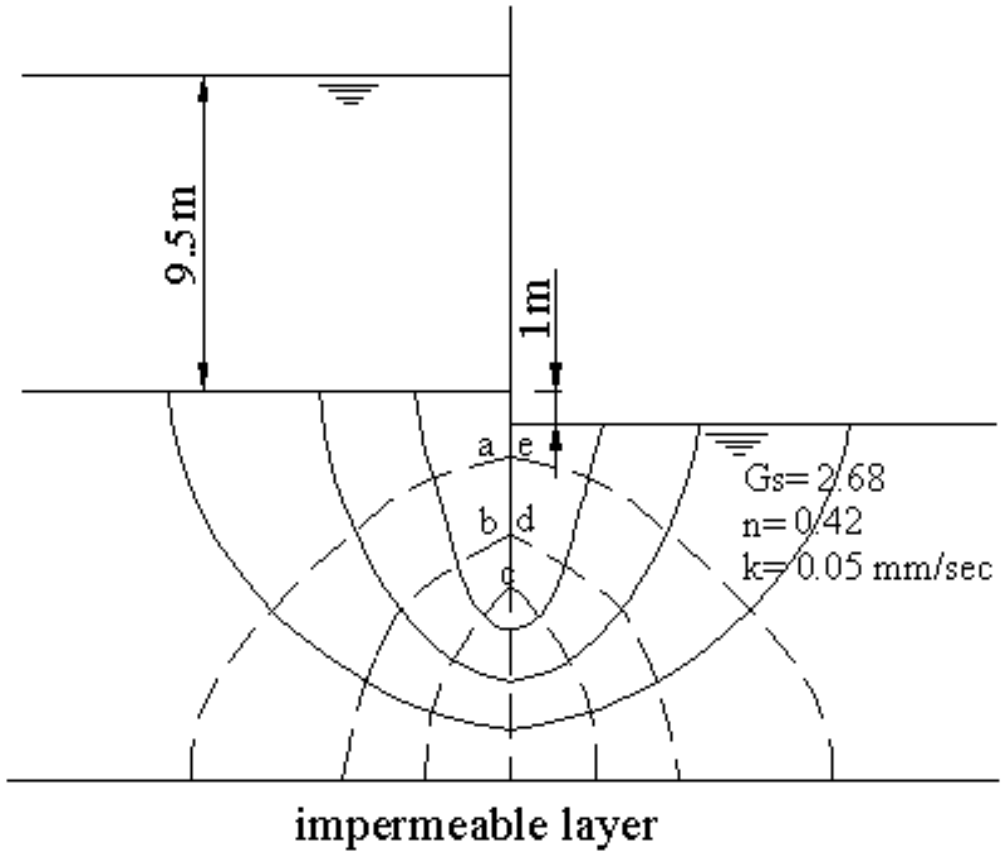

FIGURE 4